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10/686,369

10/15/2003

Craig C. Klocke

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EXAMINER

WEINSTEIN, LEONARD J

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

06/01/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|---|---|--|
| Office Action Summary | Application No. 10/686,369 | Applicant(s) KLOCKE, CRAIG C. | |
| | Examiner LEONARD J. WEINSTEIN | Art Unit 3746 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-6, 10-13, 15, 16, 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-9, 14 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment of September 29, 2008. In making the below rejections and/or objections the examiner has considered and addressed each of the applicant's arguments.

Claim Objections

2. Claim 1 objected to because of the following informalities: claim 21 is listed as "new" however it was presented in the response filed May 20, 2008. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 7-9, 14, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Du US 2002/0176784, as evidenced Du et al. US 6,375,433, in view of Kawaguchi et al. US 6,126,405. Du '784 teaches all the limitations as claimed for a

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method of controlling the angle of a swashplate 104 of a hydrostatic unit (as shown in figure 1) including: **[claim 7]** the step of the method of

- a. 602, 604, 606, 608 - generating an electric signal based on a set point signal (α),
- b. 610 - receiving the electric signal, via 318, 320, 322, in a microprocessor 324, interpolating the information from the electric signal using an algorithm contained (Eq. 1 - after ¶0031 and Eq.2 - after ¶0039) in the microprocessor 324, sending an output signal from the microprocessor 324 to a pressure control 302, and generating a pressure signal (\dot{P}_c) in the pressure control 302, determining a slew rate ($\dot{\alpha}_d$ -- as evidenced by Du '433 in column 5 line 34 where $\dot{\alpha}$ is the angular velocity of the swashplate) of the swashplate 104 based on the pressure signal, and
- c. 612 - displacing the swashplate (¶0038);

Du '784 further teaches the method including: **[claim 8]** a set point signal is generated by measuring an operational parameter (α); **[claim 9]** the step wherein the operational parameter is the angle (α) of the swashplate 104; **[claim 14]** the step including a pressure control 302 is a pilot valve with one boost spool 308 (¶0019); **[claim 21]** and the step of the method of (602) receiving a feed back signal, via element 320, within the microprocessor 324 that is dependent on an angle (α) of the swashplate 104.

Du '784 fails to teach the following limitation of a method including sending an output signal that is superimposed with a dither signal. Du teaches a pressure control

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302 that is an electro-hydraulic valve controlled by an electrical signal (¶0019).

Kawaguchi teaches that a known electro-hydraulic valve used for controlling the displacement of a variable displacement compressor uses a valve body similar to a spool (67, 75, 83), displaced by a solenoid 87 that is controlled by dither controller 93. The dither controller 93 actuates the solenoid 87 to move a valve body 67 and the degree to which the valve body 67 moves results in a valve hole that either fully opens, increases in size but is not fully open, or closes. Kawaguchi teaches a dither controller 93 that increases or decreases a target current value for solenoid 87 in response to a cooling load on the compressor which in turn affects a biasing force on a valve body 67. The dither controller sets a target current and a computer 57 commands a driver 88 to transmit an undulating current to a coil 87 of a solenoid (Kawaguchi – col. 9 ll. 11-15; 26-36). Based on the target current value, the valve body 67 will be displaced a corresponding distance that will result in a valve hole 68 opening that is either increased or decreased in size. The size of the opening 68 affects the amount of gas flow from a discharge chamber 38 to a crank chamber 15, which in turn determines the angle of the swash plate 22 and the displacement of the compressor.

Kawaguchi teaches a method using a dithering controller 93 for moving a valve body, similar to a spool valve, using a solenoid in order to change the angle of swash plate of a variable displacement compressor. Kawaguchi teaches varying the position of a valve body so that the swashplate is moved to intermediate angle positions that correspond to a current cooling demand; more than just angles that correspond to the maximum and minimum displacement of the compressor. (Kawaguchi – fig. 1; col. 9 ll. 8

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- col. 10 ll. 33; col. 10 ll. 62 - col. 11 ll. 10). The position of the valve body of Kawaguchi corresponds with the position X_v that is determined by the microprocessor 324 of Du for a spool valve in control block 610. Du calculates a desired position so that a spool valve will be moved to a desired position in order to produce a responsive movement of a swash plate for a variable displacement compressor to a desired angle position $\dot{\alpha}_d$ (Du '784 - ¶0038, 0040, 0047). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a control for a variable displacement compressor including a microprocessor which determines a desired position for a electrohydraulic servo-valve, as taught by Du, modified to incorporate a dither control which controls a target current for a solenoid which results in a valve body positioned in a specific location, as taught by Kawaguchi, in order to accurately control the displacement of a compressor, reduce consumption of power, and reduce the size of a control valve (Kawaguchi - col. 2 ll. 41-48).

Response to Arguments

6. Applicant's arguments, see page 8, filed Sep9, 2009, with respect to the rejection(s) of claim(s) 7 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Du US 2002/0176784, as evidenced Du et al. US 6,375,433, in view of Kawaguchi et al. US 6,126,405.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEONARD J. WEINSTEIN whose telephone number is

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(571)272-9961. The examiner can normally be reached on Monday - Thursday 7:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

/Leonard J Weinstein/
Examiner, Art Unit 3746